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Prevalence of bacterial vaginosis and other vaginal infections during delivery and its consequences on maternal and fetal outcome in a tertiary care hospital

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Abstract
Background: Vaginal discharge is one of the most common complaints of pregnant women. The discharge may be the result of normal physiologic adaptations of pregnancy or may result from infectious vaginitis. The activity of Lactobacillus is essential to protect women from genital infections and in normal conditions, Lactobacillus utilizes available glycogen produce lactic acid, which is able to acidify the vaginal pH to less than 4.5, inhibiting the growth of non acid tolerant microorganisms, known as potentially pathogenic. During pregnancy, alterations in estrogen and progesterone levels induce physiological changes, such as PH values, in the lower genital tract of pregnant women, and such physiological changes will result in vaginal mucosa congestion and hypertrophy, which benefit growth of anaerobic bacteria and other pathogenic microorganisms within the vagina.
Aim of the study
1. To estimate the prevalence of bacterial vaginosis and other vaginal infections during pregnancy (16 - 32 weeks).
2. To enumerate the various risk factors for vaginal infection.
3. To study the influence of vaginal infection on fetomaternal outcome.

Materials and Methods Methodology: This Prospective study was conducted in Govt. RSRM Lying In Hospital, Chennai during the period of October 2019 to September 2020 after getting approval from the Institutional Ethical Committee.
Conclusion: Abnormal Vaginal Discharge being an often overlooked symptom among women needs to be addressed as an important issue. Women hesitate to seek medical assistance until the complaint becomes intolerable and hinders routine activities. Thus, it is essential to spread awareness about the predisposing factors, symptoms and easily available treatment of vaginal infections among women particularly targeting the sexually active and reproductive age groups to reduce mortality and morbidity in mother and baby.

Keywords: Bacterial vaginosis, maternal and fetal outcome

Introduction
Vaginal discharge is one of the most common complaints of pregnant women. The discharge may be the result of normal physiologic adaptations of pregnancy or may result from infectious vaginitis. The activity of Lactobacillus is essential to protect women from genital infections and in normal conditions, Lactobacillus utilizes available glycogen produce lactic acid, which is able to acidify the vaginal pH to less than 4.5, inhibiting the growth of non acid tolerant microorganisms, known as potentially pathogenic. During pregnancy, alterations in estrogen and progesterone levels induce physiological changes, such as PH values, in the lower genital tract of pregnant women, and such physiological changes will result in vaginal mucosa congestion and hypertrophy, which benefit growth of anaerobic bacteria and other pathogenic microorganisms within the vagina.
The most common causes of infectious vaginitis in pregnancy are Bacterial vaginosis (BV), Candidiasis and Trichomoniasis. BV is characterized by a change from normal Lactobacillus dominated flora to a mixed flora consisting of Gardnerella vaginalis, Mycoplasma hominis, Mobiluncus species and other anaerobes. Certain obstetrical complications like preterm labor and preterm delivery, premature rupture of membranes (PROM), amniotic fluid infections and postpartum endometritis have been linked to occurrence of Bacterial Vaginosis during pregnancy. Candida vaginitis is responsible for 80% to 90% of infections during pregnancy.

It is characterised by vulvar and vaginal pruritis, external dysuria, white cottage cheese discharge, and vulvovaginal excoriations.

Trichomoniasis is caused by T. Vaginalis, a sexually transmitted anaerobic protozoan. It is characterised by greenish yellow frothy discharge with pruritis, it is associated with preterm labour and neonatal sepsis.

Since, different type of vaginitis can be associated with pregnancy complications, we undertook this study to know the prevalence of vaginitis in pregnant women attending antenatal clinic and its correlation with adverse pregnancy outcome.

Aim of the study

1. To estimate the prevalence of bacterial vaginosis and other vaginal infections during pregnancy (16 - 32 weeks).
2. To enumerate the various risk factors for vaginal infection.
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Materials and methods9methodology

This Prospective study was conducted in Govt. RSRM Lying In Hospital, Chennai during the period of October 2019 to September 2020 after getting approval from the Institutional Ethical Committee.

Sample size: 200

Inclusion criteria

Pregnant women of gestational age 16 to 32 weeks attending antenatal clinic and delivering at same hospital.

Exclusion criteria

1. Genital tract malignancy
2. Cervical polyp
3. Vescicovaginal fistula
4. Vaginal bleeding
5. Antibiotic treatment in preceeding 2 weeks
6. Previous h/o preterm labour /threatened preterm labour
7. Low lying placenta /placenta previa

Data collection

Out of the total 200 cases, pregnant women were equally divided into 2 groups (100 symptomatic women and 100 aymptomatic women).

A thorough general and systemic examination and a detailed obstetric examination was done to exclude exclusion criteria. Informed written consent obtained.Specimen collection: each pregnant woman was placed in dorsal position and had general and urogenital examination conducted for abnormalities such as erythema, excoriation marks and discharge. A sterile speculum used and specimens were collected using a sterile cotton swab from lateral and posterior fornices of the vagina.Also patients urine sample was collected in a sterile container to look for associated urinary tract infection.Both high vaginal swab and urine culture samples were sent to microbiology department of Government Stanley Medical College for examination.

Pregnant women with positive report were identified and treatment given as per culture sensitivity report. All of them were followed throughout pregnancy to evaluate feto maternal outcome.

Results and Observations

Table 1: Distribution of vaginal infections

	Frequency	Percent
No Growth	142	71.0
Gardenella	11	5.5
Candida	16	2.0
E-coli	17	2.5
Klebsiella	14	7.0
Total	200	100.0

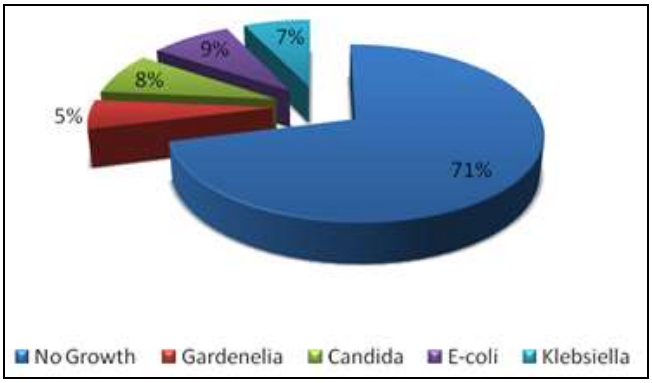

Fig 1: High vaginal swab

The above table shows the distribution of organisms causing vaginal infection in pregnancy.71% of cases have no growth in High vaginal swabwhile 29% had positive growth, *E coli* (8.75%) followed by Candida (8.0%), Klebsiella (7.0%) and Gardendla was seen in (5.5%).

Table 2: Symptoms and vaginal infection

Symptoms		No Growth	Bacterial vaginosis	Other vaginal infections	Total
Symptomatic	Count	70	4	26	100
	%	49.3%	36.4%	55.3%	50.0%
Asymptomatic	Count	72	7	21	100
	%	50.7%	63.6%	44.7%	50.0%
Total	Count	142	11	47	200
	%	100.0%	100.0%	00.0%	100.0%

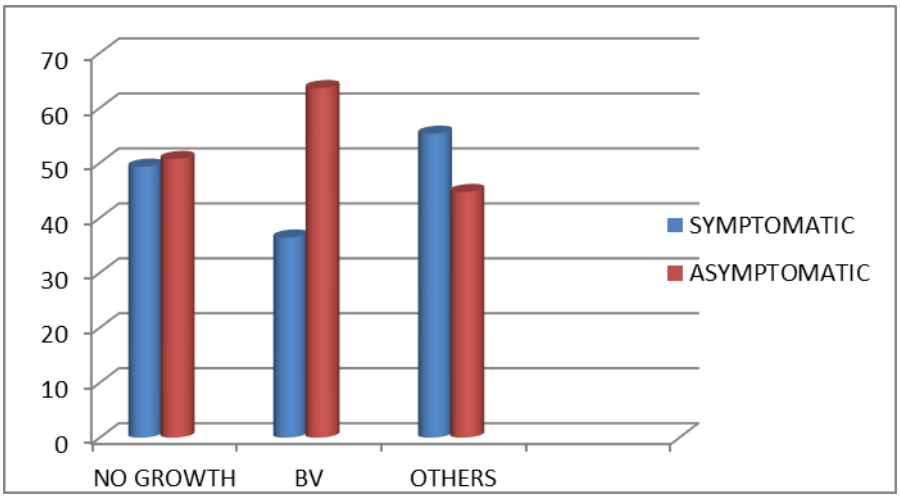

Fig 2: Symptoms and Asymptomatic

The symptoms included in this study were excessive vaginal discharge, vaginal pruritis, foul smelling discharge and dysuria. The above table (Pearson's chi-squared test were 1.378, p=0.502 >0.05) shows no statistical significance between Symptoms and vaginalinfection. This table implies that even asymptomatic cases have swab positive vaginal infections equal with symptomatic cases or even more especially in bacterial vaginosis (63.6%).

Table 3: Morbidity and vaginal infection

Morbidity		No Growth	Bacterial vaginosis	Other vaginal infections	Total
Present	Count	76	4	28	108
	%	515%	36.4%	59.6%	54.0%
Absent	Count	66	7	19	92
	%	46.5%	63 6°:	40.4%	46.0%
To-2:	Count	142	11	47	200
		100.0%	100.0%	100.0%	100.0%

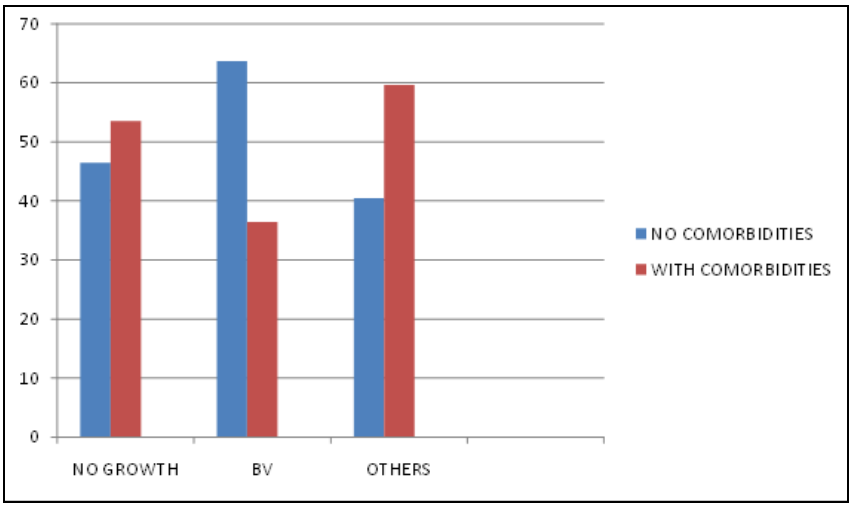

Fig 3: Morbidity and vaginal infection

The maternal morbidity included in this study were diabetes, hypertension, anemia, hypothyroid, heart disease. The above table shows that association between Morbidityand vaginal infection (Pearson's chi-squared test were 1.978, p=0.372>0.05) has no statistical significance The above table shows that infection with *E.coli*, Klebsiella and Candida are more common in women with comorbidities. (59.6%).

Table 4: UTI and vaginal infection

UTI		No Growth	Bacterial vaginosis	Other vaginal infections	Total
Yes	Count	12	2	5	19
	%	8.5%	18.2%	10.6%	9.5%
No	Count	130	9	42	181
	%	91.5%	81.8%	89.4%	90.5%
Total	Count	142	11	47	200
	%	100.0%	100.0%	100.0%	100.0%

The above table shows that association between UTI and vaginal infection (Pearson's chi-squared test 1.217, p=0.544>0.05) is not statistically significant. But compared to no growth (8%), UTI is more associated with bacterial vaginosis (18%) than other types of infections.

Table 5: Preterm delivery and vaginal infections

Terms		No Growth	Bacterial vaginosis	Other vaginal infections	Total
Term	Count	135	5	32	172
	%	95.1%	45.5%	68.1%	86.0%
Preterm	Count	7	6	15	28
	%	4.9%	54.5%	31.9%	14.0%
Total	Count	142	11	47	200
	%	100.0%	100.0%	100.0%	100.0%

The above table shows association between preterm delivery and vaginal infection (Pearson's chi-squared test 37.251, p=0.0005<0.01) which is statistically significant. Out of total 28 cases of preterm delivery, 21(75%) preterm delivery is seen in vaginal infections in our study.

Table 6: Birth weight and vaginal infections

Birth weight		High vaginal swab			Total
		No Growth	Bacterial vaginosis	Other vaginal infections	
>=2.5 kgs	Count	126	7	27	160
	%	88.7%	63.6%	57.4%	80.0%
< 2.5 kgs	Count	16	4	20	40
	%	11.3%	36.4%	42.6%	20.0%
Total	Count	142	11	47	200
	%	100.0%	100.0%	100.0%	100.0%

Association between Birth weight and vaginalinfections (Pearson's chi-squared test were 23.550, p=0.0005<0.01) is statistically significant. Out of total 40 cases of low birth weight, majority are seen in vaginal infections(BV-4,other infection-20).

Conclusion

Vaginal colonisation by pathogenic organisms, observed in 29% of pregnant women seems to have a significant influence on maternal and fetal morbidity. In our study, we observed that vaginal infections are more common in primigravida and pregnant women with comorbidities and 81.5 % of vaginal infections are confined to reproductive age group (21-35years).

In our study commonest isolated organism was *E.coli* followed by Candida, Klebsiella and Gardenella.

Vaginal infections can lead to preterm delivery, premature rupture of membranes, preterm premature rupture of membranes and meconium stained liquor, prematurity, low birth weight and low APGAR.

High vaginal swab is a simple and economical investigation that can be performed in pregnancy to predict the risk of maternal and fetal infections.

Regular antenatal checkup with history and examination of vaginal discharge, routine vaginal swab cultures should be performed in all pregnant women attending antenatal clinics, isolation of organism in culture and routine laboratory investigations for predisposing conditions like urinary tract infections, diabetes, anemia should be carried out to prevent maternal and fetal complications.

These results stress a need for proper management of vaginal discharge and pregnant women should be educated on personal hygiene and preventive measures.

In case of PROM, it is important to minimise the frequency of vaginal examinations and follow strict infection control measures in examination like as using sterile gloves and recording the number of vaginal examination in the mothers record.

Education regarding risk factors associated with vaginal infections can reduce the maternal and fetal complications.

Prompt diagnosis and treatment of Genito-Urinary infections will prevent a lot of distress to the patient. Delayed or inadequate treatment may lead to serious complications like PID causing infertility, increased risk of ectopic pregnancies, abdominal discomfort and chronic pelvic pain.

Abnormal Vaginal Discharge being an often overlooked symptom among women needs to be addressed as an important issue. Women hesitate to seek medical assistance until the complaint becomes intolerable and hinders routine activities. Thus, it is essential to spread awareness about the predisposing factors, symptoms and easily available treatment of vaginal infections among women particularly targeting the sexually active and reproductive age groups to reduce mortality and morbidity in mother and baby.

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